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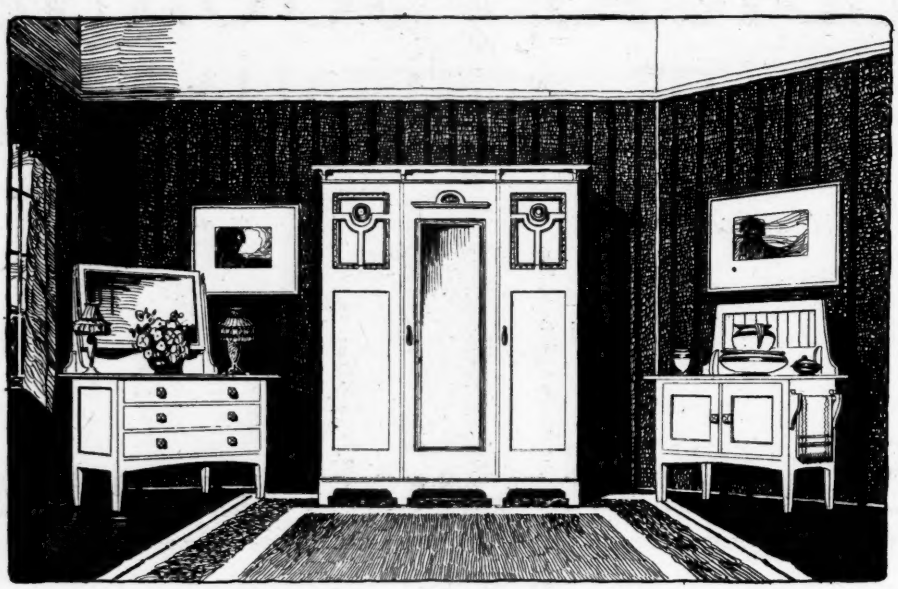

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OBSERVATIONS AND REFLECTIONS ON THE TOXICITY, THE IMMUNITY RESPONSE AND THE TREATMENT OF CERTAIN HELMINTHIC INFESTATIONS.[1]

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I.—Introduction.

When we review the local diseases in the various States of this Commonwealth, we find that Australia has its full quota of the helminths infesting man.

Apart from the less harmful intestinal parasites, such as *Tænia saginata, Tænia solium, Ascaris lumbricoides* and *Oxyuris vermicularis*, there are the more serious diseases of anchylostomiasis, filariasis, bilharziosis and echinococcosis to be investigated in the field and laboratory and to be diagnosed and treated in medical practice.

During the last decade our knowledge of the pathology and treatment of helminthiasis has been considerably increased.

We have learned that numerous helminths elaborate toxic substances or toxins which, on being absorbed with the circulation, produce pathological changes in the blood and tissues of the host. A characteristic cellular-humoral response ensues. Helminthic toxin stimulates the eosinophile leucoblastic tissue of the bone marrow, producing a multiplication of eosinophile myelocytes with increase of the eosinophile elements in the peripheral blood and also in the vicinity of worms and their ova, if these be located in the tissues of the host.

The humoral response produced by these toxic substances is characterized by the appearance of immune body in the blood, which in a number of helminthic diseases can be detected by specific complement fixation reactions.

In the intravenous administration of tartar emetic we have at our disposal a new method of treating helminths located outside the alimentary canal. The remarkable therapeutic results claimed by Christopherson (1) in 1918 for bilharziosis have already been abundantly confirmed by a number of different observers. More recently Macfie (2) has reported most favourably on the value of this treatment in guinea worm infestation (*Dracunculus medinensis*). In two recent communications Rogers (3) has demonstrated a decrease in the number of filarial embryos in the blood of cases of filariasis following tartar emetic therapy. No one will deny that certain synthetic compounds of arsenic exert a specific lethal action on a group of protozoal parasites, as is seen in syphilis, yaws and relapsing fever. Is it not time to investigate systematically whether certain preparations of antimony, correctly administered, will prove curative for a whole group of helminthic diseases also?

II.—The Causes Underlying the Pathogenicity of Helminths.

Pathogenic helminths exert deleterious effects on man in a variety of ways. By their mere presence they may set up a series of reflex disturbances of varying severity. Mechanical obstruction of the airway or of the intestinal tract resulting from a conglomeration of intestinal worms, may prove fatal. Helminths may produce ulcerative lesions of the intestinal mucosa or dilatation of bile ducts, paving the way for severe secondary bacterial infection. Or, again, ova may be deposited in the tissues and lead to pathological formations, such as ulcerations, papillomata and the like. Finally, by the secretion of toxic substances, the worms may produce remote pathological changes in the tissues of the host.

(a) Reflex Disturbances.

Perhaps this is the least important of all the means whereby deleterious effects are produced by helminthic invaders. It is also probable that future investigation will prove that many of the symptoms at present attributed to reflex disturbances are really due to toxic substances. In children a series of reflex symptoms, such as dyspepsia, sleeplessness, enuresis and convulsions, are ascribed to the intestinal parasites. Quite recently Henry (4) has described two cases of death with convulsions in children harbouring ascarides. At autopsy in both cases *Ascaris lumbricoides* was found in the appendix and Henry believes that the resulting reflex disturbances caused convulsions and death.

(b) The Mechanical Action of Helminths.

Very serious consequences due to purely mechanical causes may result from the presence of worms. Perhaps the migrations of the asearides or the pressure effects exerted by the cystic stages of the cestoda will best serve as illustrations.

In the inmates of asylums in Egypt and in parts of China it is by no means uncommon for a conglomerate mass of ascarides to produce intussusception or intestinal obstruction with death. Takaki (5) in 1915 described an interesting case of intestinal obstruction simulating intussusception in a child of four years. Fortunately two ascarides were vomited; santonin was promptly administered and after the evacuation of 117 worms *per anum* the whole condition subsided. Sudden death may also result from obstruction of the respiratory passages due to this cause. Shirkhandle (6) has recently reported a death in a child aged four years, resulting from spasm of the glottis due to the entrance of ascarides into the pharynx. Migrations to the peritoneum and liver may also result fatally. Intestinal obstruction from *Tænia saginata* has been reported.

Many of the symptoms associated with the cystic stage of the cestoda infesting man are due entirely to the mechanical pressure they exert on important viscera, ducts, nerve or blood vessels. Thus the most complex neurological picture associated with signs and symptoms of increased intracranial pressure may be met with in hydatid disease of the brain or in *cysticercus cellulosæ*, involving the central nervous system. Waterhouse (7) reported two cases of cerebral symptoms in individuals with cysticerci in the

[1] Read before the Section of Pathology of the Australasian Medical Congress, Brisbane, 1920.

muscles and eye. Generally such patients also harbour the adult tape worms (*Tænia solium*) in their intestine.

(c) Secondary Bacterial Invasion.

A dissolution of continuity of the mucous membrane of the alimentary canal necessarily predisposes to a portal bacteriæmia. Such secondary bacterial invasion has been described as taking place in anchylostomiasis and bilharziosis. In anchylostome infestation denudation of epithelium and erosion of blood vessels are certainly caused by the mouth parts of these parasites. Similarly in bilharziosis the passage of ova through the wall of the intestine causes minute lesions of the mucosa. Archibald (8) propounded the theory that the febrile phenomena associated with infestation by *B. mansoni* were due to secondary bacterial invasion. He advocated the administration of vaccines prepared from the intestinal flora. I (9) was able to disprove this theory when investigating the pathology of *B. mansoni* in infested monkeys. In these animals the stigmata of toxæmia were manifest early in the disease and prior to the deposition of ova in the tissues. Hæmoculture proved consistently negative. The conclusion reached was that toxic substances elaborated by the maturing schistosomes were the cause of these symptoms, both in monkeys and in man and that the rôle played by the intestinal bacteria in the early stages of *B. mansoni* infestations was of no significance. In the late stages of bilharziosis, however, secondary bacterial infection of ulcerations of the bladder and intestine is extremely common and always seriously modifies the prognosis.

(d) The Deposition of Ova in the Tissues of the Host.

The deposition of ova in the tissues of the host is another means whereby pathological changes are produced. In bilharziosis, for example, the presence of ova in the tissues excite a marked inflammatory response, with increase in the eosinophile leucocytes. Tiny eosinophilic abscesses are produced which, ulcerating through from the submucosa and mucosa, discharge the bilharzia ova into the lumen of the hollow viscus involved.

Such changes result not from the mechanical irritation of ova, but from toxins elaborated by the contained miracidia.

III.—Helminthic Toxin.

There is already a considerable amount of evidence to show that toxic substances are elaborated by the pathogenic helminths. Data regarding the nature and classification of helminthic toxin are more scanty. Helminthic toxin can in no way be regarded as analogous to bacterial exotoxin as its thermolability and the incubation period necessary for the production of toxic effects differ in important respects. Furthermore, the production of helminthic antitoxin and the demonstration of its action either *in vivo* or *in vitro* has never been accomplished. Helminthic toxin is in some respects allied to bacterial endotoxin. It is probably of the chemical nature of a protein or a lipoid-protein complex. The absorption of such a toxin would produce immune body, a fact which has already been demonstrated in a number of the helminthic infestations of man. In bacterial infections it is generally believed that endotoxins are only liberated after the death of the bacteria. Such a state of affairs is hardly likely to hold in the case of helminths, as generally the life cycle is not completed within the host and it is a well established fact that helminths may live for many years. It is probable, therefore, that the toxic products of the helminths will be ultimately classified as a separate type of toxin altogether.

Miram and V. Linstow (10), while studying *Ascaris megalocephala*, suffered from attacks of sneezing, lachrymation, conjunctivitis with chemosis, itching and swelling of the fingers. Such symptoms seem especially to affect those who have been sensitized by previous poisoning, some persons being insusceptible.

Weinberg (11) has made a special study of the toxin of *Ascaris megalocephala*, using the pure sterile peri-enteric liquid of this parasite.

He showed that this toxin was very active, acting even in dilutions of 1 in 5,000. Local conjunctival reactions were obtained within a few minutes on injecting amounts of 1 c.cm. into the eye of the horse and sometimes general reaction, such as dyspnœa, sweating and diarrhœa, also occurred. The toxin was thermostabile, being active after heating for 20 minutes at 120° C.. Autopsy showed that the main action of the toxin was on the hæmatopoietic organs, like the spleen, bone marrow and lymphatic glands. It is noteworthy that Bedson (12), working with the extracts of ascarides and tæniæ, produced lesions in the suprarenal capsules.

Calmette and Bretoni discovered that extracts of anchylostomes are capable of destroying red blood corpuscles; it appears probable that the severe secondary anæmia of this disease may be partly due to the absorption of a specific toxin elaborated by these parasites. Repeated hæmorrhage is another factor, for the anchylostomes secrete a substance preventing the coagulation of blood.

In infestation with *Dibothriocephalus latus* there is a severe anæmia, which may be pernicious in type and which is attributed to a secretion of the living worm or to its disintegratory products. Tallqvist (13) has shown that the lipoid of the parasite produces hæmolysis and that there is also a hæmagglutinin, which is thermolabile and which causes the appearance of antibody in immunized animals.

IV.—The Serological Reactions in Helminthiasis.

(a) The Precipitin Reactions.

To date the precipitin reaction has only been applied to the diagnosis of tænia infestations. It has not as wide an application as has the complement fixation reaction.

In 1907 Fleig and Lisbonne (14) demonstrated a specific precipitin in the blood serum of a patient with hydatid disease and in the serum of animals immunized with hydatid products. They emphasized the diagnostic significance of the reaction. Welch and Chapman (15) extended these observations over a series of cases and reported favourably on the test from the diagnostic point of view. In their opinion a positive reaction conclusively indicates hydatid, but a failure to react does not exclude the disease. They found that hydatid fluid soon loses its properties of acting as a precipitinogen. Weinberg (16) is not enthusi-

astic in his reports on the reaction. He only obtained positive reactions in one third of his cases. He doubts its specificity and states that it is altogether an inferior test when compared with the complement fixation test.

Isaac and van der Velden (17) state that the blood of patients infected with *Dibothriocephalus latus* gives a precipitin reaction with autolytic fluid obtained from this worm and that rabbits immunized with such autolytic fluids develope a precipitin.

(b) The Complement Fixation Reaction in Helminthiasis.

The essential problem in the discovery of any new complement fixation reaction centres about the production of a suitable antigen. Our lack of knowledge regarding the essential chemical constitution of pure antigen is a very big handicap in all such investigations. In hydatid disease the echinococcal cyst fluid, if uncontaminated by bacteria, constitutes an efficient antigen. With the intestinal parasites and *Trichina spiralis* extracts in saline solution of the worms have been used with some degree of success. In bilharziosis the antigen is prepared from the intermediary host—the infected snail—and very satisfactory results have been obtained.

(c) The Complement Fixation Reaction in Hydatid.

Guedini (18) first utilized the Bordet-Gengou method in the serological diagnosis of hydatid cyst of the liver.

Later Weinberg (19), Parvu and other workers reported favourable specific reactions in echinococcal disease when aqueous or alcoholic extracts of the cyst fluid or pure fluid itself was used. The pure unadulterated fluid from the cyst constitutes the best antigen. It must be free from bacterial contamination and I have recently found that its antigenetic properties are largely dependent on the scolex content of the cyst. The rate of scolex production affords a very good index to the state of biological activity of the parasite. Alcoholic extracts are inferior as antigens and give pseudo-positive reactions with syphilitic sera. The pure fluid never does this.

In hydatid disease of man immune body may be detected in the blood serum and in peritoneal or pleural exudates. I recently found the peritoneal fluid of a patient with hydatid of the peritoneum to yield a strongly positive reaction. The reaction is not obtained with cerebro-spinal fluid unless the cyst is situated within the pia-arachnoid; then it is positive. In my experience, provided the cyst is not calcified or degenerated, the reaction is almost always positive. Occasionally positive reactions are not obtained and these must be explained either on the basis of excessive impermeability of the adventitia of the cyst preventing hydatid protein from reaching the blood stream, or from deficiency of the hydatid fluid in antigenetic properties. Such accidents as suppuration or rupture of a cyst increase the intensity of the reaction by leading to increased absorption of antigen. Operative interference or puncture of the cyst leads to the same result. In one case in which the response to the test was negative about the time of operation, I obtained a positive reaction three weeks later, hydatid fluid evidently being absorbed during operative intervention.

During the past four months I have tested 285 specimens of blood by this method. The results of the investigation have been remarkably satisfactory. In no case has a positive reaction been yielded by a patient who was not suffering from hydatid infestation. The following is an analysis of the series.

(*i.*) In 16 cases of hydatid in which the test was performed before or shortly after operation (within three weeks), 14 out of the 16 cases yielded positive reactions, *i.e.*, 87.5%. Of these 14 cases 12 yielded strongly positive reactions (P +++) and two cases weaker positive reactions (P +). In two cases the response was negative.

(2) In 28 cases of hydatid treated by operation within the last two years, the response to the test was negative in 15 and positive in 13. Of these:

3 cases = P +++ }
2 cases = P ++ } Reaction
8 cases = P +

13 cases = Total positive

Probably the majority of these patients have a hydatid cyst in some site other than that removed at operation. In several of these patients re-operation has been performed and cysts have been found.

(*iii.*) In 30 other cases in which hydatid was suspected clinically, no reaction was obtained and subsequent clinical investigation has always proved the validity of the serological results.

(*iv.*) In 3 cases in which old degenerate and calcified hydatids were found *post mortem*, the response was negative.

(*v.*) In 54 cases of syphilis yielding strongly positive Wassermann reactions, the response to the hydatid test was negative.

(*vi.*) In 4 cases of bilharziosis the response was negative.

(*vii.*) In the remaining 135 cases the response was negative and there was no clinical evidence favouring hydatid infestation.

It would appear from these results that:

(*i.*) From the diagnostic viewpoint the complement fixation is of the utmost value in active echinococcal infestations. A positive reaction is absolutely diagnostic of hydatid. A failure to react in a suspicious case is strong evidence against hydatid, though it does not exclude it.

(*ii.*) From the surgical point of view the reaction promises to be of the greatest importance in indicating whether a patient is rid of all cysts or not. The exact time taken for the reaction to disappear has not been yet determined, but we hope soon to have sufficient data available to settle this point.

(d) The Complement Fixation Reaction of Bilharziosis (B. mansoni and B. hæmatobium).

In 1917, while investigating bilharziosis in Egypt, I worked out the complement fixation reaction for this disease (19A).

A unique aspect of this serological test was the nature of the antigen, which was prepared from the intermediary host—the snail. Essentially the antigen consists of a saline or alcoholic extract of the cercariæ contained in the livers of infected snails of the species

—*Bullinus dybowski* or *Planorbis boissyi*. Cercariæ are embryonic worms and after invading the tissues of man they develope into adult schistosomes, which inhabit the portal system and pelvic venous plexuses of man.

The diagnostic value of this test has been fully demonstrated and later in 1919 I used it to control the effect of tartar emetic treatment in this disease in 311 hospital patients.

The following serological reactions were obtained, "saline extracts" being used as antigen:

(*i.*) In bilharziosis of not more than two years' duration 39 out of 54 or 74% of cases yielded positive results.

(*ii.*) In another group of cases of more than two years' duration, 31 out of 46 or 67.4% yielded positive reactions.

(*iii.*) In 35 cases of syphilis no response to the test was obtained.

(*iv.*) In 170 cases of different other diseases the test failed to yield a reaction.

(*v.*) Twelve cases which were not bilharziosis, showed positive or partial positive reactions. Later in the investigation, when fresh antigen was used and the reagents more accurately standardized, this tendency to pseudo-positive reactions was not noted.

An analysis of the results obtained in an examination of the serum of 322 patients when the alcoholic extract was used, was as follows:

(*i.*) In a group of 36 cases of bilharzia of less than two years' duration 32 or 88.8% yielded positive reactions.

(*ii.*) In a group of 97 chronic cases 72 or 74.2% yielded positive results.

(*iii.*) The serum of 44 patients with syphilis all yielding positive Wassermann reactions, did not respond to the test.

(*iv.*) In 150 other sera, including protozoal, metazoal and bacterial infections, negative results were uniformly obtained.

(*v.*) In all positive serological findings ova were demonstrated in the excreta except in one case. In this patient bilharziosis could not be excluded.

(c) Results in Experimentally Infested Monkeys.

The serological reactions in experimentally infested monkeys were then investigated:

(*i.*) In ten monkeys who survived the initial toxic stages of infection, the blood reaction was strongly positive in every case. An eosinophile leucocytosis was also constantly present. A survey of the following table will illustrate these statements (Table I.).

(*ii.*) In the case of eight monkeys dying early in the disease the response to the test was negative in six and positive in two. As a general rule in these fatal cases the whole cellular-humoral response is minimal. The animals died either before there was time for an immunity response to develope or, if they survived longer, the intensity of the toxæmia caused a complete depression of the mechanism of immunization.

Table II. illustrates these facts.

Complement fixation reactions have been described in certain other helminthic diseases. Thus Stroebel (20) describes positive reactions with the sera of patients infested with *Trichina spiralis*. Guedini, using extracts of anchylostomes, ascaris and certain tæniæ, has utilized this method in these infestations with some degree of success. Meyer (21) demonstrated positive results with the blood of persons harbouring *Tæniæ saginata*. More recently similar results have been claimed for the lung fluke infestation—*Paragonimus westermanii*.

From this brief review we see that the complement fixation method of Bordet and Gengou is widely applicable in helminthiasis, that its results are reliable and that it is capable of still greater developments, not only in diagnosis, but also regarding prognosis and therapeusis.

V.—Anaphylaxis and Its Relationship to Helminthiasis.

By many medical practitioners the phenomena of anaphylaxis are restricted to serum therapy.

TABLE I.—"THE CELLULAR-HUMORAL RESPONSE IN MONKEYS RECOVERING FROM BILHARZIOSIS."

No.	Species of Infection.	Time of Observation.	Complement Fixation Test.	Eosinophiles.	Leucocytes, per c.mm.	Autopsy.
1	*B. mansoni*	11th week	Positive	22.2%	15,000	Lateral-spined ova and worms
2	*B. mansoni*	5th week	Positive	21.6%	13,000	Lateral-spined ova and worms
3	*B. mansoni*	7th week	Positive	10.7%	17,500	Lateral-spined ova and worms
4	*B. mansoni*	8th week	Positive	63.2%	28,000	Lateral-spined ova and worms
5	*B. mansoni*	7th week	Positive	24.0%	14,700	Lateral-spined ova and worms
6	*B. mansoni*	8th week	Positive	41.4%	34,400	Lateral-spined ova and worms
7	*B. mansoni*	6th week	Positive	35.0%	27,000	Lateral-spined ova and worms
8	*B. mansoni*	12th week	Positive	30.8%	—	Lateral-spined ova and worms
9	*B. mansoni*	12th week	Positive	15.5%	13,800	Lateral-spined ova and worms
10	*B. hæmatobia*	9th week	Positive	16.6%	18,000	Terminal-spined ova and worms

TABLE II.—"THE CELLULAR-HUMORAL RESPONSE IN MONKEYS DYING FROM BILHARZIOSIS."

No.	Species of Infection.	Time of Observation.	Complement Fixation Test.	Eosinophiles.	Leucocytes, per c.mm.	Autopsy.
11	*B. mansoni*	9th week	Negative	0.0%	1,250	Lateral-spined ova and worms
12	*B. mansoni*	8th week	Negative	11.9%	8,800	Lateral-spined ova and worms
13	*B. mansoni*	6th week	Negative	18.0%	18,000	Lateral-spined ova and worms
14*	*B. mansoni*	7th week	Positive	50.2%	25,000	Lateral-spined ova and worms
15	*B. mansoni*	8th week	Positive	11.0%	6,000	Lateral-spined ova and worms
16†	*B. hæmatobia*	3rd week	Negative	0.6%	2,200	———
17†	*B. hæmatobia*	5th week	Negative	—	2,200	———
18†	*B. hæmatobia*	2nd week	Negative	0.3%	3,000	———

* This monkey (No. 14) developed severe bilharzial dysentery and ultimately succumbed.

† In monkeys Nos. 16, 17 and 18 death ensued before any ova were deposited in the tissues. They were all infested by repeated submersion (at intervals of a day or two) in water containing infected snails of species *Bullinus dybowski*. As the intervals between infection were too short to permit of hypersensitiveness to cercarial protein developing, their death could only be attributed to toxæmia—a finding which was demonstrated at autopsy and by microscopical examination of their tissues.

Recently Hadwen and Bruce (22) have described a remarkable anaphylactic condition in sheep and cattle produced by the larvæ of warble flies (*Hypoderma bovis, Hypoderma lineatum* and *Œstrus ovis*). They proved that warble larvæ (which are deposited and inhabit the subcutaneous tissues of these animals) produced a condition of allergy or hypersensitiveness to larval protein. On injecting extracts of these larvæ intravenously anaphylaxis became established within a few minutes. The symptoms in these animals were laboured breathing, cough, excessive salivation and lachrymation, dribbling urine and fæces. Cyanosis was marked, the colour becoming a livid purple; collapse symptoms ensued with staggering gait, convulsions and death. Autopsy showed an absence of coagulation of blood, dilatation of the right side of the heart and hæmorrhages into the mucous membranes of the lung and alimentary canal. Similar, though milder features, were observed to occur spontaneously in cattle when traumatic rupture of warble larvæ embedded in the subcutaneous tissues occurred.

If such sensitization can be produced by warble larvæ there are no reasonable grounds for presupposing that a similar state may not be produced by helminths. From the clinical viewpoint there can be little doubt that the phenomena resulting from the rupture of a hydatid cyst or its leakage after puncture are anaphylactic in nature. Excluding hydatid embolism there are many cases on record where the escape of hydatid fluid into a vein has been followed by faintness, dyspnœa, diarrhœa, vomiting, cold extremities, imperceptible pulse, cyanosis, low blood pressure symptoms, collapse and even death.

Escape of fluid into veins at operation or into a serous cavity may be followed by similar symptoms, though generally they are of less severity. More often the features are those of fever, mild systemic disturbances and urticaria—a condition somewhat akin to serum sickness. These symptoms are accompanied by a rise in the number of eosinophile leucocytes and are probably also anaphylactic in origin. Mr. Hamilton Russell has very kindly sent me the following description of the case of a patient whom he saw in consultation with a leading Melbourne surgeon:

> Many years ago I received an urgent call to the consulting-room of a leading surgeon. I found my friend in the greatest alarm, supporting in his arms an elderly man, who was squatting over a chamber-pot on the floor of the consulting-room, with the bowels acting. The man was blue, the veins of the forehead distended; he was cold, sweating, pulseless and apparently about to die. I assisted in carrying the patient upstairs when he was put into bed and under the influence of external warmth and ordinary stimulation he gradually recovered, but it was some ten or twelve hours before he was regarded as sufficiently recovered to permit of his removal to a private hospital. The condition had supervened rapidly upon the withdrawal of a small quantity of hydatid fluid with a hypodermic syringe from a hydatid of the liver.

There is experimental evidence to show that a state of hypersensitiveness may be demonstrated in animals. Ghedini and Zamorani (23) failed to get anaphylaxis on direct injection of hydatid fluid into the belly or vein of animals made hypersensitive by continuous injection of hydatid fluid, but anaphylactic phenomena followed when the injection was made intradurally.

Weinberg and Cuica (24) produced passive anaphylaxis in guinea-pigs with the serum of 20 out of 23 human beings with hydatid by first injecting human serum and subsequently injecting hydatid fluid. They conclude that the production or not of passive anaphylaxis in guinea-pigs by the serum of patients will be useful in the diagnosis of hydatid disease.

The diagnostic value of Casoni's intradermal reaction in hydatid disease is still being investigated. The test consists of the injection of the clear cyst fluid or of a watery extract of cyst wall and fluid into the dermis. A positive reaction is indicated by a patch of erythema which appears in 12 hours and is followed by an œdematous infiltration, which is painful and tender and which lasts for several days. Luridiana (25) has recently reported favourably on the value of this reaction. Testi and Zoli (26) report positive results in thirty cases of echinococcal disease and in a long series of other patients negative findings were recorded. They also state that as the test indicates the degree of hypersensitiveness to hydatid protein, exploratory puncture is justified when the result of the intradermal test is negative. It should, however, never be done when the test elicits a positive response and this is the rule in echinococcus disease.

In certain of my control cases definite local toxic reactions have been observed on the intradermal injection of hydatid fluid; in consequence I cannot refrain from being somewhat dubious about the ultimate value of this test.

Anaphylaxis has been considered to be the basis of certain fatalities in children who harbour *Ascaris lumbricoides*. This theory ,however, lacks verification.

VI.—The Cellular Response in Helminthic Infestations.

The characteristic cell appearing in helminthic infestations is the eosinophile leucocyte.

Toxic substances elaborated by worms or their ova possess the property of attracting eosinophile elements and of stimulating the eosinophile leucoblastic tissue of the bone marrow to produce these cells in greater quantity. Herrick (27) by injecting an aqueous extract of *Ascaris lumbricoides* intraperitoneally found that a marked eosinophilia in the blood was produced. The substance causing eosinophilia was a protein. He showed that previous sensitization with the extract was necessary to produce the eosinophilia.

Day (28) working with extracts of bilharzia worms produced both an eosinophilia in the peripheral blood and an accumulation of eosinophile cells at the site of injection. Weinberg and Sequin (29) injected extracts of helminths into the peritoneal cavity of guinea-pigs and demonstrated an exudate rich in eosinophiles. On injection of a suspension of *B. subtilis* or *B. coli* the eosinophile cells engorged the bacilli before the ordinary polymorphonuclear leucocytes appeared. They thus demonstrated the phagocytic properties of eosinophile leucocytes.

In later work Weinberg and Sequin proved that eosinophile cells absorb the toxins of helminths. Furthermore it was shown that hydatid fluid, if placed

in contact with the cells of peritoneal exudate, lost its toxic properties more rapidly if the exudate was chiefly composed of eosinophile cells. Similarly it was demonstrated that hydatid fluid lost much of its antigenic property on contact with eosinophile cells, the antigen being fixed by these cells.

These workers concluded that eosinophile cells having absorbed toxic products from hydatid fluid, play a further important rôle in elaborating specific antibody.

VII.—Reflections on Treatment.

The type of drug and the method of its administration in helminthiasis is dependent on the anatomical situation of the parasite.

In intestinal infestations a relatively insoluble anthelmintic must be administered *per os*.

Where the habitat of the parasite is in the blood vascular system or in the tissues of the host, a soluble specific is required which must be given by the intravenous route and the drug pushed to its physiological limit.

(i.) Intestinal Parasites.

The different species of intestinal parasites call for the administration of different drugs. Thus in anchylostome infestation thymol is indicated, in the tape worms liquid extract of male fern, in the ascarida santonin is advocated. During treatment certain precautions must be taken to secure optimum conditions for drug action and to prevent the drug being unduly absorbed.

Fasting and a preliminary clearance of the contents of the bowel are important adjuvants to treatment. During treatment solvents like oils and alcohol which increase absorption of certain anthelmintic drugs, are contraindicated.

Terminal purgation assists mechanically in the expulsion of parasites and in the case of such drugs as thymol and male fern it decreases the toxic effects on the host by increasing the rate of passage of the drug through the intestinal canal.

(ii.) Parasites Situated Outside the Intestinal Tract.

The action of drugs on parasites located outside the alimentary tract of the host has not been fully investigated. The lines for such investigation in helminthiasis are clearly indicated and in previous publications I (30) have emphasized this point. Firstly the lethal effect of various drugs should be investigated *in vitro*, the parasites being kept in serum. Animals should then be experimentally infected and the intravenous administration of suitable drugs investigated. If a complement fixation reaction is available, this test should be used to control the effects of treatment and final conclusions should be established at autopsy. If the parasites occur within the vascular system, it will be advisable, if possible, to introduce the helminthic drug in a colloidal form, as such a condition will tend to keep the drug longer within the vessels. On the other hand, if the parasite is extra-vascular, the employment of a soluble drug with a smaller molecule is indicated, as it will have a greater chance of getting through the capillaries to where it is required. Christopherson's claims for the efficacy of tartar emetic treatment in bilharziosis have been abundantly confirmed. In 1919 I (31) treated several cases in Egypt, controlling treatment not only by examination of the ova content of the excreta, but also by serological tests and cystoscopical examination. As a result of the data obtained an urgent report was sent to the highest medical authority, calling attention to the necessity for immediately treating all cases of bilharziosis which had occurred amongst members of the Australian Imperial Force.

In such conditions as bilharziosis and filariasis where parasites are in the blood stream, the administration of drugs administered by the intravenous route is certainly a rational procedure.

In the encysted stages of the tape worms, such as human cysticercosis (*T. soluim*) and hydatid cyst (*T. echinococcus*), the presence of a fibrous adventitia separating the parasite from the tissues of the host might be regarded as forming an impermeable barrier to drug treatment.

There is, however, a continual interchange going on between the blood in the vessels of the adventitia and the cyst itself. The parasite receives both its oxygen and food supply from the vascular system of the host, while the presence of immune body in the blood of hydatid cases proves that hydatid products are continually escaping into the circulation.

It is therefore not impossible for an anthelmintic of small molecular structure to traverse the adventitia, where, conceivably, it might poison the parasite and set up a series of degenerative changes, culminating in natural cure—a result not infrequently observed at autopsy.

At the Melbourne Hospital we have commenced an investigation along these lines and are treating patients with hydatid disease by intravenous injections of tartar emetic and controlling the results by serological examinations. These results will be communicated at a later date.

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Reviews.

FEEBLE-MINDEDNESS.

Dean Stanley, describing the ancient Egyptians, once remarked how like giants they were: slow to move, but when they moved, they moved like giants. The same might well be said of Great Britain in her attitude to the control of mentally defective children. After the efforts of voluntary organizations for over a generation, a Royal Commission in 1904 took evidence and issued a voluminous report in 1908. Royal Commissions are doubtful agencies where progress is desired. Some have proved but polite extinguishers to stifle urgent public demands which seemed likely to trouble time-serving politicians; others have provided a decent burial for annoying enthusiasms.

In this instance the Commission proved the opposite. Its report gathered together the enlightened wisdom of acknowledged experts and focussed this in well-considered legislation—the *Mental Deficiency Act of 1913* and in 1914 by the *Elementary Education (Defective and Epileptic Children) Act* made the provision of education for mental defectives no longer a permissive function, but the bounden duty of local education authorities.

No nation in history has ever, during a world crisis, gripped the needs of its internal conditions like Great Britain when it rose to the occasion and brought in so advanced a piece of legislation as the *Education Act of 1918*, which was actually discussed and carried through Parliament during some of the darkest hours of the war, with the Germans knocking at the gates of Amiens.

Amongst other provisions, physically defective and epileptic children were included with mental defectives, so that now all trainable defectives between seven and sixteen years of age must be dealt with by the education authorities.

The practical discussion of present methods, legislative or otherwise, lends especial interest to the second edition of Paget Lapage's well-known hand-book on feeble-minded children of school age.[1] The first edition (1910) gave a practical exposition of the subject in the light of the Royal Commission report, 1908, with special attention to the hereditary factor and to the essential need of extending control and care over the whole lifetime, particularly the reproductive period, of these unfortunate defectives. An added interest is given by the work of a lady of Australian origin, Miss Mary Dendy, now Commissioner of the Board of Control, then a leading figure in connexion with one of the best examples of the best method of after-care for these children—the Farm Colony for Mental Defectives at Sandlebridge, near Manchester.

The new edition (1920) has been brought up to date and forms an excellent practical hand-book for the social worker, doctor or teacher, whose duty it is to handle children of this type. Its issue at the present time is, like Tredgold's text-book, most opportune.

For many years State legislatures have entertained the idea of a more effective handling of mental deficiency. Finance has always been a stumbling-block and so the ante-natal period of our own mental deficiency legislation does not yet show the quickening signs of a new birth. We have capable experts to insure a sound beginning. We have most effective compulsory school attendance regulations, which provide a very complete control on all children. Britain's example should stimulate the institution without further delay of adequate legislation urgently necessary and long looked for to give the essential powers for the effective handling of the problem.

To make this completely effective, the general practitioner, as in social health, so in mental health, is the fighting unit and by such books his powers may be trained and utilized in this most important aspect of national child welfare.

Lapage deals exhaustively with administrative aspects, with clinical types and gives in his book the first-hand ideas of an experienced worker. One only criticism may be levied and this applies to England in general. For some reason or other Binet's method of estimating mental level, as distinguished from chronological age, does not seem to have caught on in Great Britain. It may be that the unwise "boosting" and modifications to suit the local palate carried out in America has spoilt the freshness of Binet's own scale and prejudiced English observers.

At any rate, on page 124 we find this epoch-making discovery virtually damned with faint praise, yet the only substitutes apparent are crude, unstandardized and inadequate.

The objection is laid, first, of time taken—a more than doubtful objection; for the mental examination of a child, with its possible legal aspects, demands most pains-taking methods. Fernald's opinion is quoted to support the idea that they are more suited to teachers than physicians. We venture to assert that Fernald would be the last to belittle the importance of the estimation of the mental level, for he includes it in his ten fields of inquiry, the best clinical method yet outlined for the final diagnosis of feeble-mindedness. The truth would seem to be that feeble-mindedness is a symptom-complex, with no pathognomonic sign or symptom. Even intelligence level is no infallible guide to the

[1] Publications of the University of Manchester: Medical Series, No. XIII., Feeble-Mindedness in Children of School Age, by C. Paget Lapage, M.D., M.R.C.P., with an Appendix on Treatment and Training by Mary Dendy, M.A.; Second Edition: 1920. London, New York and Bombay: Longmans, Green & Co.; Crown 8vo., pp. 309, illustrated by 13 plates.

diagnosis of the higher grades of the defect, yet the intelligence level is vital to the investigation and the Binet scale does give a better impersonal standardized test of intelligence level than any other known method. One can well imagine the practitioner of 100 years ago musing in similar strain on clinical thermometry, for example. It is "elaborate," "time is used up." "It is not effective often where most needed," *e.g.*, a gangrenous appendix, serious pneumonia. "It corroborates where corroboration is not needed and is not decisive where decisive tests are needed." He might well have said "it is useful for teachers," or nurses, or mothers "in selecting cases for the physician" than for the physician himself. Compare the use of the thermometer in quarantine work. Could he not tell pyrexia himself, simply by the palm of his hand? But what physician or surgeon to-day would be without this impersonal standardizing instrument, even though "some cases can pass the test that in the light of other data are obvious," like "ambulatory typhoid." The fact is that more and better scientific tests, psychological or otherwise, are badly needed and progress depends on the realization of the old Hippocratian text that experience is fallacious and judgement difficult. Every endeavour is needed to translate the intuitive procedures of the practised physician into accurate, standardized, impersonal record. As in war, so in medicine, we need not only the man behind the gun, but a first-class weapon in front of him.

The hand-book is, however, on the whole, most trustworthy and faithfully represents English experience. An excellent bibliography of articles, as well as books, is appended.

HYPNOSIS.

The war has brought into prominence once more the value of hypnotism in the treatment of the psycho-neuroses. Its application to similar conditions in civil life is gradually extending. Dr. Wingfield's book, "An Introduction to the Study of Hypnotism," can be confidently recommended to those who wish to commence this study.[1] It presents in a concise form the essential facts and chief problems of hypnosis. There is so much prejudice and scepticism towards the use of hypnotism that anything that will help to dispel the fears and remove the ignorance is welcome. This little book, with its sane and modern treatment of the subject, will do much towards this end. At Nancy, in the clinic of Dr. Liébeault, the people of the town used to come to him for a treatment by hypnotism and suggestion as readily and unconcernedly as other patients come to their doctors for advice and medicine. There have been several revivals of psycho-therapeutics in modern times. Each one has played its part in the evolution and scientific development of the problem. Mesmer thought that the hypnotic condition was due to a magnetic fluid or influence. The next advance was made by Braid, of England, who rejected the magnetic theory and proved that it was due to the power of suggestion alone. Liébeault placed it upon the sound foundation which it occupies to-day.

Hypnotism is not now the only method used by the psycho-therapeutist. Suggestion alone, persuasion and suggestion and psycho-analysis are also used in the treatment of the psycho-neuroses. Psycho-analysis is a long and difficult process and Dr. Wingfield points out that this difficulty makes it impracticable in many cases. To some patients, especially those with a simple repression, hypnosis offers a short cut to the recovery of the repressed incident and the removal of the symptoms. He quotes ten interesting examples of cases treated in this way.

In his introductory remarks Dr. Wingfield gives his definition of hypnotism. He improves upon Bernheim's definition, that hypnotism is the production of a psychical condition in which the faculty of receiving impressions is greatly increased. The author states that "hypnotism is a psychical condition in which suggestions are not only much more easily accepted, but are also realized with an intensity much greater than is possible in the normal state." This is still unsatisfactory, but it is as far as we can go with our present knowledge of the condition. We are still a long way from being able to define the nature of hypnotism. We can only deal with its phenomena.

The chapters on the induction of hypnosis and the phenomena of hypnosis are the most valuable ones in the book. Several methods of induction are detailed and contrasted with the author's own method. From a long series of experiments the author has divided the phenomena of hypnosis into six stages. The description of these stages and the comparison with the stages of other authorities must be left to the readers of the book.

The scope and size of the book do not permit of a full description of treatment by suggestion. Enough is given to whet the appetite of the reader and he will have to refer to larger treatises for a more satisfying account of the benefit to be derived from this treatment.

The case against hypnotism is put in a few pages in the last chapter. The objections mentioned by the author and others would all disappear if the use of hypnotism were restricted to qualified persons and its use for other than medical purposes prohibited.

Psycho-therapy is so successful in the treatment of the psycho-neuroses and it is providing so useful a solution of the problem of the neurasthenic that the general practitioner cannot afford to neglect it. This book will give him the broad outlines of the subject and will give them to him in a concise and readable form.

[1] An Introduction to the Study of Hypnotism: Experimental and Therapeutic, by H. E. Wingfield, M.A., M.D., B.C. (Cantab.); Second Edition, 1920. London: Baillière, Tindall & Cox; Crown 8vo., pp. 195.

THE BOY SCOUTS MOVEMENT.

His Royal Highness the Prince of Wales is the Chief Scout for Wales in the Boy Scouts Association. He has recently issued an appeal, which has been published in the daily newspapers throughout the Empire, for the sum of £200,000 to enable the Association to "carry on."

It will be within the memory of every reader of *The Medical Journal of Australia* that Sir Robert Baden Powell instituted the movement by holding a trial camp at Brownsea, in England, in the year 1907. The idea was based on two sound principles. In the first place, the scouts would acquire in the course of their training an intense feeling of loyalty and a determination to contribute to the safety of the Empire in case of need. In the second place, the training was so planned that each individual scout would derive an immense physical benefit from it. Both these factors, the Imperialistic and the hygienic, have appealed strongly to the medical profession. The success attending Sir Robert Baden Powell's undertaking was so great that after three years he was compelled to leave the army in order that he might devote his immense energies to this voluntary establishment, then containing 123,930 boys. During the first five years of its existence the Boy Scouts Association suffered one disability. It was not incorporated. In 1912 this defect was remedied by the granting of a Royal Charter of Incorporation. In Great Britain there are to-day 250,000 boy scouts and nearly 1,000,000 in other parts of the world. Everybody knows what the boy scouts did during the war, how 100,000 of them served and 10,000 never came back. Eleven of these boys have received the greatest reward for valour in existence—the Victoria Cross. These few facts are surely sufficient to compel every citizen of the Empire, and especially medical practitioners, to view the movement with sympathy and admiration and to wish to contribute to its success. And there are countless other reasons in its favour. Donations should be sent direct to His Royal Highness the Prince of Wales, K.G., Chief Scout for Wales, St. James's Palace, London, S.W..

The annual cricket match between the Sydney and Royal Prince Alfred Hospitals will take place at the University Oval on Wednesday, March 16, 1921, at 2 p.m.. The Sydney Hospital team will be chosen from the following: Drs. Steer Bowker, Sir Herbert Maitland, Stacy, Bell, Aspinall, Bullock, Shepherd, Cedric Bowker, Furber, Terrey, J. G. Edwards, W. A. Edwards, Reading, Willcocks. The Royal Prince Alfred Hospital team will be Drs. Dansey, Molesworth, Morton S. A. Smith, Gibson, Fisher, Poate, Waddy, Woodburn, Tebbutt, Storey. Former resident medical officers of the two hospitals are invited to be present.

The Prime Minister has appointed Dr. Andrew Honman the Principal Medical Officer of New Guinea.

The Medical Journal of Australia.

SATURDAY, MARCH 12, 1921.

The Medical Research Council.

Nearly a year ago the Medical Research Committee, which had been constituted under the provisions of the *National Health Insurance Act* and which came into being in 1914, ceased to exist and a new body was created in its stead. This new body is known as the Medical Research Council. The Committee was appointed by the Insurance Commissioners; a special committee of the Privy Council has been constituted to perform functions similar to those carried out by the Insurance Commissioners. The Medical Research Council is governed by a charter. The money required is provided out of consolidated revenue subject to conditions imposed by the Treasury. The amount voted by Parliament for the expenditure of the Medical Research Council for the financial year 1920-1921 was £125,000. The Council is empowered to hold properties including the National Institute for Medical Research at Mount Vernon, Hampstead. Viscount Goschen, C.B.E., has been appointed Chairman and the Honourable Edward Wood, M.P., Treasurer of the Council. At the instigation of the Privy Council the Medical Research Council has been brought into intimate contact with the Ministry of Health, both officially and informally, while the same kind of communication has been established between the Council and the chief medical officers of the Scottish Board of Health and of the Ministry of Health for Ireland. There is a further association with the Home Office, with the Army and Navy, with the Board of Trade and with the Pensions Ministry. It will thus be seen that adequate machinery has been created for the purpose of enabling the Medical Research Council to carry out practical scientific medical research. The Council has been instructed to stand in close relationship with the Department of Scientific and Industrial Research, so that the two bodies may co-operate in the study of problems entering into the purview of both. The Privy Council, through the mouthpiece of Mr. A. J. Balfour, the Lord President, has announced in the first annual report of the Committee of the Privy Council for Medical Research that instructions have been given to the Medical Research Council to consider "in what ways their organization of research work may be brought into useful relationship to the corresponding organizations already established in the Dominions overseas."

The charter has been drafted in a very liberal manner and its terms are so framed that the Medical Research Council is enabled to continue the work of the Medical Research Committee and to extend and vary the duties of the Committee to a considerable extent. The usual provisions of a body corporate are included, namely, the power to sue and to be sued, to enter into contracts or agreements, to accept, hold and dispose of money and other personal property, to accept trusts and "generally to do all other lawful acts that may be conducive or incidental to the attainment of the objects for which the Medical Research Council has been established." Many provisions deal with the qualifications of the members of the Council, while the remainder determine the manner in which the moneys required by it for the performance of its work are to be provided and the uses to which these moneys may be put.

In order to examine the possible significance of the direction of the Committee of the Privy Council concerning the relations of the Medical Research Council and similar organizations in the overseas dominions, it may be advisable to consider the methods adopted by the now extinct Medical Research Committee and its successor—the Medical Research Council. It will be within the recollection of the majority of medical practitioners that the original idea of the medical research scheme was included under the rubric of the tuberculosis benefit of the *National Health Insurance Act*. At the time when this measure was being drafted, it was held that of all the channels of preventive medicine, the one which gave greatest promise of immediate and direct economic success, was tuberculosis. In Germany large sums of money had been expended out of the accumulated funds from State insurance on the establishment of sanatoria for consumptives and on continuous clinical and laboratory research into the pathology and treatment of this disease. In Mr. Lloyd George's scheme

provisions were made for the early introduction of this important movement. One penny of the Government contribution per insured person was allocated to this purpose. In 1913 the Insurance Commissioners defined a wider policy which became effective after the approval of the regulations of 1914. The Committee on its appointment was enabled to undertake any medical research thought desirable. One of the first acts of the Committee was the purchase of a property at Mount Vernon, Hampstead, in the north-west district of London. For a time the money used by the Committee was expended on what we may term piece work. Certainly highly trained practitioners in the various branches of laboratory work were engaged and appointed to form standing committees. These experts worked in different laboratories scattered throughout the country. In some cases the research workers were salaried by the Committee; in others grants in aid were made. The records of many investigations were published under the auspices of the Committee, notwithstanding the fact that the connexion between the Committee and the research workers was slender. The first year's work proved to some extent disappointing. No doubt this was caused by the outbreak of war shortly after the establishment of the Committee. It was, we are convinced, largely a result of the failure on the part of the Committee to build up a comprehensive and extensive organization for controlled and co-ordinated research under a master mind. Too much was attempted and a disordered conglomerate presented itself rather than an ordered system constructed with the view to expansion and growth. We have already criticized the policy of the Committee in expending of the greater part of its income on the salaries of the few members of the staff of the four or five committees and on equipment. Without proper grading of remuneration, it is impossible to attract a large army of competent young workers to adopt research as a life's calling. Failure was averted by the war. The Medical Research Committee possessed the skeleton of an organization for extensive research on all the medical problems of an extensive military organization. There was no need for elaborate machinery, while the fact that the workers were all in uniform, drawing military pay, solved the financial difficulty.

The Medical Research Council has taken over the programme initiated by the Medical Research Committee. The same committees have been employed, the same members of the staffs are responsible for the development of their departments. There is one fundamental difference. The standing committees of the Medical Research Council are now housed at Mount Vernon. In other words, the advocates of centralization have apparently triumphed over the protagonists of dispersion. But not in its entirety has this plan been adopted. Some co-operation has been sought and gained with existing institutions throughout Great Britain. The year's work embraces many subjects and is by no means limited to the laboratory. Outside the National Institute the workers receive some payment, but are either engaged as part-time servants of the Council or borrowed for a short time. There does not appear to be any definite plan for securing the services of the most brilliant young practitioners to devote all their energies and intelligence as permanent officers of the Council. The association with the governmental departments and with other recognized bodies seems to be more of the nature of interchange of opinions than that of a planned co-ordination of work. Under a scheme of decentralization well directed and controlled activities attacking one or a few problems from many aspects might be productive of more valuable results. The chances of success would probably be enhanced, if the plan embraced a system of attracing men and women with ability and training them to this peculiar form of work.

In Australia we have no "corresponding organization" which might be brought into useful relationship with the Medical Research Council. We have neglected to provide them. Our governments have offered no money for preventing disease. It is late, but not too late to begin. The establishment of a Federal Council, moulded somewhat after the Medical Research Council, modified in the directions indicated above, would enable us in Australia to join hands with the great organization in the mother country, to the benefit of our race and of humanity.

HIGH BLOOD PRESSURE.

Since Riva Rocci devised the sphygomomanometer for the estimation of the blood pressure in the radial artery, many modifications of the instrument have

been invented and used. For many years it has been considered a desirable part of the equipment of every practitioner. With its help many estimations have been made and as many conclusions drawn. To what extent the measurement of blood pressure has been a valuable and useful guide to the physical condition of a patient remains a debatable point. That it is a valuable adjuvant to other diagnostic measures is beyond doubt, but it is equally certain that grave conclusions have often been drawn from the consideration of a high blood pressure alone and the patient's subsequent history has failed to justify the serious view taken. The reason is that we are still far from a clear comprehension of the physiological processes which regulate the rise and fall of pressure within the vessels in health and in disease. We have, indeed, some reasonable grasp of the factors which regulate the pressure in healthy persons, but in disease other important processes come into play of which our understanding is still primitive. Too often, also, we fail to distinguish between these variations which are compatible with apparently good health and those which are indicative of the presence of disease. Under the influence of certain physiological processes the blood pressure may rise. During prolonged and intense excitement there is an increase in the rate and power of contraction of the heart and a corresponding rise in the tension within the vessels. Certain drugs, *e.g.*, adrenalin, cause marked contraction of the peripheral arterioles and a consequent rise of the blood pressure. The pressure may also be increased as a result of the increased supply of blood within the vessels, as after the operation of transfusion or after a full meal. A physiological increase also occurs at the menopause. These variations are impressions of the activity of the vaso-motor and other mechanisms which control the pressure within the vessels.

Arterial hypertension of a more or less permanent kind, however, is associated with certain pathological processes and the factors governing this relationship are but dimly understood. The clinician who observes that the radial pressure of a certain patient is 200 millimetres of mercury, suspects that the patient is suffering from chronic nephritis and he examines the urine and determines as far as possible the degree of impairment of the renal functions. But he is confronted with the problem of the cause of the excessive pressure. He is puzzled as to whether the relationship between the high blood pressure and the chronic inflammatory changes in the kidneys is one of cause and effect, or effect and cause, or, again, whether they are separate, independent manifestations of the general disease process. Again, it is known that hypertension may exist without any apparent evidence of renal disturbance. There may be a more or less generalized sclerosis of the vascular tree with no definite localization in the vessels of the kidneys. Further, the so-called essential hypertension or hyperpiesia to which Sir Clifford Allbutt has drawn attention, is a condition in which there is in the early stages little apparent degeneration of the arterial system and no insufficiency of the kidneys. Hyperpiesia is a term from which we may gain a little comfort, but it gives us no indication of the means by which the increase of pressure is brought about. It seems feasible that in a healthy person at least, the diastolic pressure may be considered as an expression of the tone or minimum pressure of the vessel wall, whereas the systolic pressure is a gauge of the minimum pressure *plus* the pressure caused by the contraction of the heart. But what factors come into play in increasing the diastolic and systolic pressures, *i.e.*, what are the mechanics and chemistry of the increase in the case of morbid conditions, it must be admitted we do not know.

Since the problem of hypertension has not been palpably solved, the question of its treatment remains a matter for controversy. Some physicians agree as to the value of blood pressure readings in diagnosis, but ignore them in the determination of the patient's treatment. Others are zealous in their efforts to reduce the pressure and consider this a vital part of the treatment. Whichever view is correct, it must be conceded that it is unwise to draw the patient's attention to the abnormality. The readings show frequent variations and the pressure estimated in the consulting room, where the atmosphere is more impressive than homely, is often higher than when the patient is less excited. It is reasonable to suppose that a patient who is greatly concerned as to the height of the pressure readings, will probably be found to have a higher reading than would otherwise be the case. It should also be remembered that the diastolic blood pressure is even more important than the systolic and that a rapid fall in the readings may be of ominous significance. While the pressure remains high the medical attendant may be sure that the heart is performing its function well.

But although an exalted blood pressure may be evidence of the heart's ability to maintain the circulation, a gradual reduction may be a valuable therapeutic measure. The problem, however, is how to effect this reduction. Dr. Fred. M. Allen, of New York, has insisted that the pressure will fall if the patient lives on a diet free, or comparatively free, of salt. Dr. E. Moschcowitz claims a similar result when the diet is similar to that given to patients with diabetes—fruit, coffee, tea without sugar, meat, green vegetables, salad, cheese and a limited quantity of bread. Some rely on the exhibition of potassium iodide and drugs with a vaso-dilator action. Benzyl benzoate is the fashionable medicament of the day, but it is as yet too soon to estimate its value. A not inconsiderable number of physicians have abandoned drug therapy as a treatment of little or no value. All these varieties of opinion are evidences of our ignorance both of the actual significance of hypertension and of the means by which it may be reduced. At the same time it is within the experience of most that the patient feels more comfortable when even a partial reduction is effected. Whether it be by a modification of his habits and mode of life, by a sane regulation of his diet or by the exhibition of drugs, a gradual lowering of the pressure readings is certainly a comfort both to the patient and his physician.

Abstracts from Current Medical Literature.

OPHTHALMOLOGY.

(92) Newer Methods in Perimetry.

L. C. Peters emphasizes the importance of a study of the special features found in the central zone (*Brit. Journ. of Ophthal.*, October, 1920). The classical perimeter merely delimits the outlines of a given field, and fails in the important rôle of helping the surgeon to study the changes peculiar to the central zone. The tangent plane is now the instrument of choice in all central field studies. For rapid and practical routine work an advance has been made by using the tangent plane at close range. An instrument of this variety is the author's campimeter. In addition to the shortening of the working distance, the average normal blind spot of Mariotte has been definitely placed and outlined on the screen, so that the blind spot may be studied with ease. Gradle's hand campimeter is operated at a distance of 60 cm., The test objects consist of metal balls, which are moved on the tangent surface by a magnet from behind the screen. Though there is much to commend in it, it is purely a laboratory instrument. The Bjerrum method at a distance of two metres has not come into favour in the United States of America, except for special studies. A great progress is the evolution of the stereoscopic methods of Hartz and Lloyd. Robert H. Elliot's scotometer in the author's opinion lacks elasticity. Objections have been made to the practice of testing at close range, but the author does not consider these objections of great weight. The test object should be larger at the periphery to overcome the decline of retinal sensitivity. Glasses can always be worn if necessary. It is true that an error is proportionately greater as the distance is shortened, but this disadvantage can be overcome. The advantages of close range are the sharp definition the patient can make, the prompt recognition of colour tones and the ease with which he can concentrate on the fixation point. The size of the test object should be expressed as an angle, for an estimation in millimetres gives no accurate information unless the distance at which the experiment is performed, is also stated. A thirty minutes test object is the smallest stimulus which will yield satisfactory results. At one metre this test object will measure 8.75 mm.; when the author's campimeter is used it will measure 1.5 mm.; and on the average perimeter of 33 cm. radius it will measure 3 mm.. For coloured objects one degree is required and for the periphery two degrees should be the standard. A certain amount of vibration should be given to the object in testing the periphery and in all cases the object should move from a blind to a seeing area. The illumination should be standard artificial daylight. The arc perimeter is best adapted for outlining normal or nearly normal fields, but for no other purpose. This can be done with equal facility on a tangent screen. The author would abolish the arc perimeter. If an eye is blind centrally, fixation may be accomplished by placing the patient's finger on the fixation point and instructing him to look at his finger. This he can do by muscle sense.

(93) Detachment of the Retina.

Derrick T. Vail deplores the almost hopeless outlook in cases of detached retina and offers some new thoughts to stimulate others and arouse discussion which may lead to better results (*Archives of Ophthalmology*, November, 1920). He contends that myopia *per se* is not a cause, as detachment of the retina occurs in not more than one in a thousand cases of myopia. His theory is that disease of the *pars ciliaris* is the essential factor predisposing to detachment. It is due to paralysis of the mechanism of secretion of the aqueous humour, caused by disease or shock affecting the secretory cells of the ciliary processes. Secretion of aqueous humour being arrested, there follows a condition of "minus tension," together with the phenomena of diapedesis and transudation. The vitreous humour also contracts because it loses its percolating supply of aqueous. The embryology of the eye should be recalled. The posterior wall of the optic cup becomes in the process of development the pigment layer of the retina, which adheres to the *lamina vitrea* of the choroid. The anterior wall of the optic cup becomes the remaining part of the retina. The space between the pigment layer and the retina proper (the cavity of the primary optic vesicle) never becomes completely obliterated. It is here, therefore, that transudation of serum may collect from the choroid when the intra-ocular tension falls and produce retinal detachment. The ciliary glands are continuously in action and are under the control of hormones. If the active ferment, hormone or zymogen which excites the flow of aqueous humour, could be discovered and extracted, it might be used with success in cases where there is a lack of aqueous flow. The value of trephining the sclera is that it destroys the osmotic pressure of the fluid behind the retina by draining it off. The benefit from subconjunctival injections may be explained on the theory that they lower the osmotic subretinal pressure. Pilocarpine stimulates the secretion of aqueous and atropine retards intra-ocular drainage and thus when used together they tend to raise the intro-ocular pressure. The attempt to create adhesions between the retina and its pigmented layer by the injection of irritating solutions is strongly condemned.

(94) Spontaneous Rupture of a Glaucomatous Eye.

W. J. Rutherford relates the case of this occurrence in a woman who, five years before, had her right eye injured by a broken bottle (*Brit. Journ. Ophthalm.*, June, 1920. The eye became blind, no doubt, from chronic glaucoma and she became subject to severe, intermittent headaches. The day before the eyeball burst, the headache became worse; she was confined to bed; the cornea suddenly gave way, discharging water and blood. She at once began to vomit quantities of watery material. The amount of hæmorrhage was very slight.

(95) Treatment of Glaucoma by Miotics.

W. C. Posey surveys the causation of glaucoma and compares the secretion theory, which contends that it is due to an increase of secretion caused by some form of nervous irritation, with the retention theory, which claims that a mechanical obstruction is offered to the outflow of fluids from the eye (*Archiv. of Ophthalm.*, May, 1920). Lagrange believes that both causes are in action. As an early ophthalmoscopic sign the author mentions the tendency of the scleral ring to become visible all round the disc and to become broader. In a series of cases published some years ago the author found that the results after ten years of cases treated with miotics compared favourably with those in which iridectomy was performed. It is necessary to instil the drug every third or fourth hour without interruption throughout life. Unfortunately, patients very often fail to co-operate with the doctor. For this reason the author finds himself as the years go by counselling operation more and more. He advises operation on the more affected eye and the application of miotics to the better eye. Operation on the second eye should follow if vision is found to be better maintained in the surgically treated eye than in the other. Operation should be resorted to if the disease progresses despite the faithful use of the drug for six or eight weeks.

(96) A New Operation for Glaucoma.

E. J. Curran's operation differs from all others, in that it is an attempt to drain from the posterior into the anterior chamber (*Archives of Ophthalm.*, March, 1920). He contends that in glaucoma this passage is impeded on account of the iris hugging the lens over too great a surface extent. The success in iridectomy, iridotasis and sclerectomy with iridectomy depends on the establishment of drainage into the anterior chamber. In the few cases where the filtering angle was closed, Elliot's or other scleral drainage operation was necessary. The author has been using Elliot's operation largely, but has abandoned it for his own. It consists in puncturing the limbus with a Knapp's needle with the edge turned up, puncturing and counter-puncturing the iris close to the periphery and cutting a hole in the iris. He describes 15 cases in which the operation was performed.

LARYNGOLOGY AND OTOLOGY.

(97) Malignant Growths of the Upper Jaw.

Malignant growths of the upper jaw are rare. E. D. D. Davis (*Lancet*, November 27, 1920), in a survey of 39 cases, found that the pathological find-

ings were squamous carcinoma in 19 cases, the majority originating in the ethmoid bone and spreading along the roof of the antrum; round-celled sarcoma, also beginning in the ethmoid, in 5 cases; endothelioma or columnar-celled carcinoma, a more favourable type, also originating in the ethmoid, in 7; papilloma, originating in the inferior turbinal region, in 3; the rarer chondro-sarcoma, an inoperable type of undiscovered origin, in 2; spindle-celled sarcoma, arising in the antro-nasal wall, in 2; and melanotic sarcoma, originating in the vestibule of the nose, in one case. The commonest first symptom was persistent pain in the cheek, radiating to the forehead or temporal region and accompanied by a blood-stained discharge. In some cases there was severe epistaxis. The average duration of symptoms before the patient was seen was three months. Nasal examination at this time revealed a polypoid-looking swelling in the region of the middle turbinal bone, which bled freely when probed. Transillumination showed a dark antrum and a skiagram showed a still more definite opacity of that region. Later symptoms were proptosis, epiphora, expansion of the walls of the antrum and, finally, a puffy swelling of the cheek below the infra-orbital margin. Operative interference in malignant disease of the upper jaw should comprise, in the author's opinion, a thorough exposure of the growth to ascertain its limits and complete excision of the growth, together with a free margin of healthy tissue. The orthodox anatomical operation of excision of the upper jaw has been discarded. The teeth are put in order at once and if half the palate is to be removed, a denture or obturator is prepared and fitted immediately after completion of the operation. Intratracheal ether is the best anæsthetic. The usual Ferguson incision is made with the omission of its horizontal limb. When it is necessary to remove the palate the upper jaw is excised. Permission is obtained before operation to remove the eye, if necessary. The mucosa of the palate is saved, if possible, for a flap to close off the nose from the mouth. Preliminary ligature of the external carotid is unnecessary unless a dissection of the glands of the neck is made as the first stage of the operation, though in most cases it is better to attack the primary growth first.

(98) Tumours of the Nervus Acusticus.

Harris H. Vail record the findings in ten cases of verified tumour of the eighth nerve by the Bárány rotation and caloric tests (*Laryngoscope*, August, 1920). In the majority typical reactions were obtained, *viz.*: (1) Unilateral deafness on the side of the lesion varying from absolute to a marked involvement. (2) Failure to obtain, by the caloric test, after-nystagmus and past-pointing from stimulation of the labyrinth on the side of the lesion and in some cases failure to obtain after-nystagmus and past-pointing from stimulation of the vertical canals on the side opposite to the lesion. (3) The time of the after-nystagmus obtained by rotation as a general rule is decreased, but does not show that there is a blocking of one labyrinth. Rarely there is found a halving of the after-nystagmus time when rotation to the side opposite to the lesion is done. Vail thinks this is due to the compensation resulting from the chronicity of the lesion. (4) The past-pointing tests following rotation, as a rule, do not show any reactions that may be classed as typical. The reactions are abnormal and are probably influenced by involvement of the cerebellum through direct or indirect pressure. (5) In two cases with failure to produce nystagmus by the caloric test of the unaffected side, when similar tests were made after operation, they showed absence of nystagmus and past-pointing reactions on the side of the lesion, with practically normal response from stimulation of the opposite side. The author thinks that the side opposite to the lesion was affected by increased pressure and that this caused to a great extent the irregular reactions found by the rotation test. (6) Post-operative tests of the cochlea on the side involved showed an increase in its function in some of the cases. (7) Unilateral paralysis of the external rectus muscle may cause unequal involvement of the eyes in spontaneous nystagmus. In after-nystagmus by stimulation this is a negligible factor. (8) The reactions showed that often, as in lesions of the cerebello-pontine angle, the vertical semi-circular canals of the side opposite to the lesion fail to respond to stimulation.

(99) Tuning-Fork Tests.

A. Retjo (*Laryngoscope*, July, 1920) discusses the results of the tuning-fork tests in regard to the localization of lesions and affirms: (1) That the end-organ of the cochlea has only one stimulus, *viz.*, the wave-like motion induced in the labyrinthine fluid. (2) That in the case of air-conduction the perception of the lower and higher tones take place with the help of the conducting apparatus. The only difference is that for perception of lower tones the transforming action of the drum and ossicles is necessary, whereas for the higher tones it is quite enough if the two windows function normally. (3) In bone-conduction there must arise the same wave-like perilymph motion which is produced in the case of air-conduction, because it is the only stimulus for the auditory nerve. This motion, directed towards the round window, arises in the labyrinthine fluid through the molecular vibration of the skull bones, but simultaneously there is produced another motion directed towards the oval window. As only the first of these motions is necessary for perception, in case of bone-conduction, only the functioning of the round window is required. (4) If neither of the windows is elastic no wave-like motion can arise in the fluid and there is neither stimulus nor perception. If the lower tones are normal and the higher tones shortened in the case of air-conduction, the disease is in the perception apparatus. If the higher tones are normal and the lower tones are shortened, the disease is in the transforming part of the conducting apparatus. Shortening of the lower, as well as the higher, tones gives no definite information as to the local diagnosis and in this case several tuning-forks should be used. In regard to bone-conduction the shortening found in elderly persons is probably due to rigidity of the membrane of the round window and not to senile involution of the cochlear nerve. In middle ear inflammation the oval window usually shares with the ossicles and tympanic membrane in the swelling and immobilizing of the mucosa and there is lengthening of the bone-conduction. But if the round window is also involved, bone-conduction will be shortened and the perception of higher tones by air considerably diminished. In oto-sclerosis the shortened bone-conduction is probably due to ossification of the structures in the vicinity of the oval window and even those extending as far as the round window.

(100) The Origin of Sporadic Congenital Deafness.

That sporadic congenital deafness is identical with true hereditary deafness, that it is hereditary and that such heredity is Mendelian, are views affirmed by James Kerr Love (*Journ. Laryng., Rhin., Otology*, September, 1920). There are six possible unions between the deaf and hearing in the human family: (1) A hearing man, both of whose parents heard and did not carry hereditary deafness, marries a similar woman. No deaf children can result. This is the case in far more than ninety in every hundred marriages. (2) A deaf man, both of whose parents are hereditarily deaf, marries a similar woman and all their children are deaf. (3) A pure hearing person marries a pure deaf-mute and all the children hear, but several of the grandchildren are deaf. (4) A hearing man carrying deafness marries a hearing wife carrying deafness and both deaf and hearing children follow. Deaf children must follow if the family be large. (5) A hearing man carrying deafness marries a pure hearing woman and no deafness will result. But half of the children will carry deafness and if any of these wander into classes (2), (3), (4) or (6) deaf children will result. (6) A hearing man carrying deafness marries a pure deaf woman. Half the children are deaf and all the children carry deafness. This is a common type of marriage among the deaf. The six classes agree with the Mendelian phenomena, as displayed by the crossing of tall and short peas and the subsequent self-fertilization of the resulting hybrids. Sporadic congenital deafness, according to the above view, is due to the meeting of two heterozygotes—hearing hybrids carrying deafness.

British Medical Association News.

ANNUAL MEETING.

The annual meeting of the Tasmanian Branch was held in the Rooms of the Royal Society of Tasmania, Hobart, on February 11, 1921, Dr. James Sprent, M.C., the President, in the chair.

Election of Office-Bearers.

The following were elected without opposition the office-bearers and members of Committee for the ensuing year:

President: Dr. R. G. Scott.
President-Elect: Dr. G. Hogg.
Vice-President: Dr. J. Sprent, M.C..
Members of Council: Dr. T. C. Butler, Dr. G. E. Clemons, Dr. W. W. Giblin, C.B., V.D., Dr. G. Sprott, Dr. H. W. Sweetnam.
Honorary Treasurer: Dr. H. W. Webber.
Honorary Secretary: Dr. A. Brettingham-Moore.
Honorary Auditor: Dr. Stewart Gibson, M.C..

The President, speaking in the name of the Branch, eulogized the work of Dr. Arthur E. Hayward, the retiring Honorary Treasurer, and expressed regret that he was leaving the State.

Annual Report.

The annual report of the Council was read, received and adopted.

Annual Report for 1920.

The Council have to report the termination of the legal struggle instituted to secure the deregistration of Dr. Ratten.

The Government was finally compelled to introduce an amending clause to the *Medical Act* virtually condoning any offence committed seven or more years prior to the Act. Further comment is needless.

The expenses incurred were heavy and up to date only 24 out of a total of 79 members have contributed. The total amount contributed by the 24 members is £138 12s.; £115 are still needed.

As this question was fought for the benefit of the profession as a whole, the Council feels that members should consider it their duty to contribute.

The membership of the Branch is now 79; 15 new members have joined; one has resigned and one has left the State.

There were 12 general meetings in the year, with an average attendance of 11.

The Council held 17 meetings, the attendance being as follows:

Dr. J. Sprent	13
Dr. W. W. Giblin	12
Dr. A. E. Hayward	12
Dr. E. Brettingham-Moore	17
Dr. T. Butler	13
Dr. Scott	11
Dr. Sweetnam	9
Dr. Lines	7

Financial Statement.

The Honorary Treasurer submitted a financial statement. The credits amounted to £394 5s. 5d., including £256 17s. 9d., the amount of the subscriptions of members. Among the disbursements were £153 5s. paid to the British Medical Association (Head Office in London), £102 19s. 6d. paid to the Australasian Medical Publishing Company, Limited, £26 10s. travelling expenses, £18 5s. 6d. for stationery and postages, £10 for rent and £3 gratuity to the caretaker. The financial statement was adopted.

Dr. D. H. E. Lines was elected Representative of the Branch on the Representative Body and Dr. A. E. Hayward was elected Deputy Representative.

Presidential Address.

The retiring President, Dr. Sprent, announced that he was departing from the usual custom of reading a formal presidential address. He addressed the meeting on the subject of fidelity and interpreted the term in a very liberal sense.

He then introduced Dr. R. G. Scott to the meeting as President.

Professor R. J. A. Berry addressed the meeting on the prospects for the medical profession in Australia and in England.

H. T. Illingworth, Esq., M.B., Ch.M., 1920 (Univ. Sydney), of Toowoomba, has been elected a member of the Queensland Branch.

Edwin Trenerry, Esq., M.B., Ch.M., 1920 (Univ. Sydney), of the Royal South Sydney Hospital, has been nominated for election as a member of the New South Wales Branch.

The undermentioned have been elected members of the New South Wales Branch:

W. D. K. Craig, Esq., M.B., Ch.M., 1919 (Univ. Sydney), Abbotsford Road, Homebush.
C. V. W. Brown, Esq., M.B., Ch.M., 1920 (Univ. Sydney), "Wyncroft," 104 Alfred Street, North Sydney.

MEDICAL WOMEN IN SYDNEY.

A meeting of medical women was held at the Women's Club, Sydney, on February 22, 1921, at which it was decided to form an association of medical women, to be known as the New South Wales Association of Registered Medical Women. A Committee was appointed, consisting of:

President: Dr. Harriett Biffen.
Honorary Treasurer: Dr. Margaret Harper.
Honorary Secretary: Dr. Lucy Gullett.
Members of the Committee: Dr. Constance D'Arcy, Dr. Nell Farrar, Dr. Marjorie Little, Dr. Marjorie Ross.

The first meeting will be held at the Women's Club, King Street, Sydney, on Tuesday, March 22, 1921, at 8.15 p.m., for the purpose of adopting a constitution.

THE WALTER AND ELIZA HALL INSTITUTE OF RESEARCH IN PATHOLOGY AND MEDICINE.

The following is the annual report for 1920 presented by the Director of The Walter and Eliza Hall Institute of Research in Pathology and Medicine to the Board of the Institute on December 22, 1920.

Director's Report.

The bacteriological, bio-chemical, histological and serological departments of the Institute have been equipped and are in full working order; the department of experimental pathology is not yet completed, however, owing to delay in delivery of kymographs and other heavy apparatus ordered in England.

Dr. H. Hume Turnbull has lent his electro-cardiographic apparatus for research work and this is being installed in the Institute. Mr. A. E. T. Payne has placed his microphotographic equipment at the disposal of the Institute and it is now in use for recording the work. The trustees of the late Dr. G. C. M. Mathison have presented his collection of scientific books and reprints to the Institute and these are being catalogued to form the nucleus of a reference library.

Researches.

It was decided that the Institute should devote special attention to two main researches: (*i.*) the various problems of hydatid infestation of man, since echinococcosis is still widely endemic in the southern States of Australia; and (*ii.*) an investigation into the incidence and ætiology of acute respiratory infections, interest in which had been greatly stimulated by the occurence of pneumonic influenza.

Hydatid.

Dr. Hamilton Fairley has undertaken an investigation of the value of the complement fixation reaction in echinococcal infections, a method which has been used considerably in Europe (Guedini, Weinberg and others), but has not hitherto been successfully applied to the diagnosis of hydatid diseases by Australian workers. Preliminary experiments were made to determine the most suitable hydatid antigen and the best method of its standardization. A series of 480 cases from Victoria, South Australia and New South Wales was investigated. Fifty-three patients suffered from hydatid disease; of these, forty-seven (89%) gave positive serological reactions. No patient other than those affected with hydatid infestation yielded positive results. The diagnostic value of the reaction in clinical medicine has therefore been fully confirmed.

An even more important aspect is the value of the test in prognosis. Observations by the workers in the Institute indicate that the reaction disappears within three months of a successful operation, unless a second cyst be present. If future results confirm this, the test will afford much valuable information to the surgeon in indicating whether the infestation is of multiple or single type.

These results were briefly reviewed in a paper by Dr. Fairley entitled "Observations on the Immunity Response in Helminthiasis, and Reflections Regarding treatment," read before the Section of Pathology of the Australasian Medical Congress, Brisbane, 1920.

In a few hospital patients with hydatid disease the therapeutic value of tartar emetic given intravenously has been investigated. The results have been disappointing. No alteration of positive serological reactions has resulted and no evidence has been obtained that tartar emetic traverses the adventitia and reaches the encapsuled parasite. The administration of 1.5 grm. (25 grains) of the drug failed to produce any evidence of degeneration in the cyst demonstrable at operation.

Work is being continued on these lines and the scope of the research is being extended to include the experimental pathology of hydatid infections.

Pneumonia.

Dr. S. W. Patterson and Miss F. E. Williams have carried out a series of observations on the bacteriology of acute respiratory diseases in Victoria. They have made cultures from the lungs and bronchi of 324 persons examined *post mortem* and are correlating the germs recovered with the nature of the lung condition found to be present. Special attention has been paid to the cultural characteristics of the pneumococci and allied germs; their bio-chemical reactions and serological types, according to the American classification with Mulford sera, have been examined. They have also prepared type sera by immunizing Australian wild rabbits and are engaged in classifying the pneumococcus group of bacteria occurring in Australia. By these methods, the germs found in the sputum of 143 persons suffering from pneumonia and broncho-pneumonia have been classified. A preliminary account of the results obtained was contributed to the discussion on pneumococci in the Section of Pathology of the Australasian Medical Congress, Brisbane, 1920.

Protozoal Diseases.

Owing to the danger of the introduction of new disease into Australia by returned members of the Australian Imperial Force, it was decided to continue in the Institute the study of certain protozoal and helminthic diseases commonly encountered in the near east. Dr. Hamilton Fairley and Mr. H. R. Dew have commenced a series of studies on malaria, the dysenteries and the pathology of human bilharziosis. The first conjoint paper was based on "Observations on the Clinical and Applied Pathology of Malarial Infections" and was read before the combined Sections of Naval and Military Medicine and Surgery and of Pathology of the Australasian Medical Congress.

Another paper based on an analysis of 1817 cases of dysentery or suspected dysentery observed in Egypt, has just been completed. It emphasizes particularly the necessity for re-investigating with modern bacteriological methods the colitis of adults and the ileo-colitis of infants from the standpoint of bacillary infection.

A detailed investigation of the pathology of human bilharziosis (*B. mansoni* and *B. hæmatobia*) is now being made. The observations on the morbid anatomy are based on *post mortem* examinations of 250 cases of urinary and intestinal bilharziosis. Material for microscopic examination was derived from 50 selected cases and the 150 blocks of tissue which were brought from Egypt, are affording abundant scope for study of the more delicate pathological features of these diseases. The results completely verify the observations on experimental bilharziosis already published. The completed work should constitute a most detailed study of the pathology of bilharziosis.

Wassermann Reaction.

A certain amount of experimental work has been carried out in regard to the Wassermann reaction by Dr. Fairley. A serological examination of 1,707 hospital patients suspected of syphilis has been made, the Harrison technique being used. The majority of the tests have also been carried out by the ice-box method and a comparison of the results made. The clinicians and staff of the hospital have supplied accurate clinical data regarding the cases and throughout the series there has been a remarkable uniformity of results. At least 99% of all the cases which were clinically syphilitic, have yielded positive Wassermann reactions.

The proportion of patients in a general hospital with serum yielding a positive Wassermann reaction who die at a later stage and are subject to *post mortem* examination, is high (33% in the series of 148 cases); the opportunities for examining the results of long-standing syphilitic infection on the various organs of the body are numerous. Dr. W. W. S. Johnston and Dr. Patterson are carrying out an investigtaion of syphilitic aortitis and have examined 148 persons *post mortem*, correlating the macroscopic and microscopic appearances with the results of the Wassermann test.

Cancer Research.

Dr. P. A. Stevens has been working in the Institute since April under the terms of the John Grice Cancer Research Scholarship. He has undertaken the investigation and recording of cases of malignant diseases occurring in the Melbourne and Austin Hospitals. A series of 62 cases of epithelioma of the lip was examined and the results were embodied in a paper published in *The Medical Journal of Australia*.[1] A case of long-standing nasal polypi sent to the Austin Hospital as sarcoma of the nose was as the result of investigation dealt with at the Melbourne Hospital and cured by operative treatment.[2] Dr. Stevens and Dr. R. Wettenhall are working on the action of X-rays on the skin. Dogs and guinea-pigs are being used in these experiments. The results are as yet incomplete, but should throw some light upon the effect of X-ray therapy in malignant cases.

Six reports have been sent to the Cancer Research Committee of the Melbourne University, embodying the work done during the past nine months.

Clinical Research.

Dr. H. F. Maudsley, Clinical Research Scholar, has been working on the clinical side of the pneumonia investigation and has made observations on the degree of leucocytosis as a guide to prognosis and on the Arneth count in various grades of severity of pneumococcal infection. With a view to determining the occurrence of shock as a factor in the mortality of pneumonia, observations have also been made on the hæmoglobin content of venous and capillary blood in these cases.

Intestinal Infections.

During the past year Dr. Patterson has been investigating the bacteriology of gall-bladder infections. He has also worked with Miss Williams on cases of enteritis and colitis occurring in the hospital and in the practice of medical men interested. Already results are being obtained pointing to a considerable amount of true dysentery amongst these patients; the Flexner-Y group of dysentery bacilli occurring in Melbourne is being investigated and classified serologically.

THE FEDERAL MINISTRY OF HEALTH.

A special issue of the *Commonwealth of Australia Gazette* was issued on March 3, 1921, announcing that His Excellency the Governor-General had approved of the establishment of a Department of Health as from March 7, 1921, with the following functions: "The administration of the *Quarantine Act*; the investigation of causes of disease and death; the establishment and control of laboratories for this purpose; the control of the Commonwealth Serum Laboratories and the commercial distribution of the products manufactured in those laboratories; the methods of prevention of disease; the collection of sanitary data and the investigation of all factors affecting health in industries; the education of the public in matters of public health; the administration of any subsidy made by the Commonwealth with

[1] *The Medical Journal of Australia*, November 20, 1920, p. 472.
[2] *The Medical Journal of Australia*, December 11, 1920, p. 533.

the object of assisting any effort made by any State Government or public authority directed towards the eradication, prevention or control of any disease; the conducting of campaigns of prevention of disease in which more than one State is interested; the administrative control of the Australian Institute of Tropical Medicine; the administrative control of infectious disease amongst discharged members of the Australian Imperial Force; generally to inspire and co-ordinate public health measures and any other functions which may be assigned."

The statement has been published in the daily press that the new Ministry will be entrusted to the Honourable W. Massy Greene, Minister for Trade and Customs, and that Dr. J. H. L. Cumpston, Director of Quarantine, will be appointed the permanent head of the department.

The creation of a Commonwealth Ministry of Health has been advocated in these columns for several years. The Federal Committee of the British Medical Association in Australia recommended its establishment as part of its policy for the extension of the public health services about a year ago. Other factors have contributed toward the consummation of this proposal. The demand emanated not only from the medical profession; it came also from the public. The Government registered the arguments in favour of the establishment of a department of health and was obviously prepared to listen to the counsel of Dr. Victor G. Heiser, the Director for the East of the International Health Board of the Rockefeller Foundation. As was announced in a recent issue, Dr. Heiser offered to the Prime Minister the services of three specialists from the International Health Board on two conditions. The first was that the Commonwealth would co-ordinate its hygienic activities with those of the undertaking initiated by his Board in Queensland and elsewhere in the Commonwealth and its dependencies. The second was that there should be established a special department of health. This offer was accepted and the Prime Minister has lost no time in fulfilling his promise.

From the list of functions of the new department quoted above, it will be seen that machinery is to be forged for the performance of duties which have not been recognized before in the Commonwealth. Provision for the institution of a branch of the department to deal with industrial hygiene is a healthy indication of a modern conception of hygiene. The inclusion of preventive medicine, if properly conceived and adequately carried out, reveals the desire to remedy the effects of Australian public health administration in the past. The development of an extended activity for the prevention and combating of tropical diseases is another good sign. Lastly, the planning of a cordon of laboratories for the assistance of general practitioners in arriving at correct diagnoses suggests to us that the new department is alive to its responsibilities.

We learn that one of the first actions of the Department has been to instruct Dr. J. S. Elkington, Chief Quarantine Officer in Brisbane, to proceed to the Dutch East Indies, Singapore, the Federated Malay States, the Philippine Islands and British and late German New Guinea, with the object of acquainting himself with the nature of any diseases which may threaten Australia from the north, with the nature of the control of these diseases by the authorities in these countries, with the views held in the various districts on matters connected with tropical medicine and hygiene and with the details of the problems in New Guinea which will require the attention of the Commonwealth Health Department. The policy underlying the creation of this mission is admirable. Hitherto it has been no one's business to safeguard Australia from an invasion by deadly tropical diseases other than at our own ports. A systematic programme of prevention of tropical disease has not been elaborated before. It is therefore necessary to begin at the beginning. A study of the possible dangers is essential if these dangers are to be met with a prospect of success. The programme appears to be more extensive and more ambitious. We have preached the gospel of research, of scientific study, as the fundamental step in preventive medicine. Dr. Elkington's tour is to be undertaken partly for the purpose of gleaning undiscovered facts and new aspects of old problems. If we read the indications correctly, it would seem as though the authorities have in view the establishment of research centres in British New Guinea and in the mandate territories. At present the medical services in these parts are imperfectly organized and not well controlled. If the Commonwealth Government accepts the responsibility of the public health arrangements in New Guinea, Australia will no longer be exposed to a risk of unknown magnitude, while the territories will benefit by the introduction of measures aiming at the safety of the present inhabitants and future settlers. Moreover, the co-ordination of a modern health department with research organizations would prove of immense value to the whole civilized world.

The further developments of the new Ministry will be watched with intense interest.

The Minister for Trade and Customs has issued a proclamation on March 2, 1921, declaring the port of Busselton, Western Australia, to be a first port of entry for vessels arriving from oversea, for the purposes of the *Quarantine Act, 1908-1920.*

THE STATE CHILDREN OF QUEENSLAND.

The annual report of the Director of the State Children's Department of Queensland for the year 1919 is cast on the usual lines and contains much information of communal importance. Unfortunately, the medical profession as a whole has interested itself but little in the problems involved in the care and control of neglected children, of uncontrollable children, of orphans and of mentally defective children, problems which belong properly to the large book of hygiene.

In Queensland, as we have pointed out year after year, there are five State institutions and eleven recognized private institutions under the control of religious or other bodies. We gather from the report that these various homes and schools have suffered no change of a material nature during the year under review. The number of admissions to the care of the Department was 2,335. The causes of admission were of the usual nature, a large percentage being the fact that the father had died, was an invalid or had deserted his wife or mistress and the mother was unable to support her child. During the course of the year 1,522 children were discharged and 80 died. The reason for the discharge is either that the child has reached the age of 18 or that an order is made after full inquiries on the application of the parent. Boarded-out children, under the care of their own mothers or other relative, are discharged at the age of 14. Under certain circumstances the control is continued until the child is 21 years of age.

On January 1, 1919, there were 7,037 children under control. As has been stated above, 2,335 children were added to the number before the end of the year and 1,602 were deducted. Of the 7,770 children under control on the last day of the year, 4,971, or 64.1%, were boarded out with female relatives, 1,111 were placed in institutions, 968, or approximately 12.5%, were boarded out with foster mothers, 440 were hired out, 178 were released on probation, 73 were adopted, 15 were in hospital and 14 were in other institutions. We would direct attention to the fact that 14.4% of the State Children were inmates of the State or other recognized institutions and 12.5% were boarded out with foster mothers. We hold that the boarding-out system, under proper safeguarding, including inspection and careful selection, has been shown to be a far better system than the institutional system. In New South Wales, 25.3% of children are boarded out with strangers.

Some idea of the problems of the State Children's Department is gained from the study of the reasons for admission of the 2,335 children. In no less than 2,196 instances the Department was called upon to provide support for the child either because one or both parents were dead or because one or both parents were unwilling or unable to support the child. In 116 instances the children were committed by the Bench. This, however, does not exhaust the number of convictions made at the Children's Court during the year. The total number of children found guilty of various offences was 375. Larceny was the most frequent offence and appears 167 times in the list. No information is given which would assist the reader in estimating the real nature of the misconduct. It is not sufficient to have regard to the so-called offence. The mental condition and the moral education of the offender must be taken into consideration. In the case of 14 infants the admissions were based on the provisions of the *Infant Life Protection Act*, while the Department was required to accept responsibility for nine uncontrollable children.

An endeavour is made to collect from the responsible parents of State children as much as they can spare towards the maintenance of their children. This collection frequently entails compulsion. The total amount collected during the year was £8,471. The expenditure, on the other hand, amounted to £160,335.

It is stated in the report that great difficulty is at times experienced in securing homes in which to board out State children. The foster mother is required to be a woman in good circumstances whose character is beyond reproach, who belongs to a Protestant denomination, who has had experience of children and in whose home there is accommodation for from two to six children. During the course of the year 968 children were placed out in 247 homes. The foster mother receives 10s. a week for each child under two years of age and 8s. or 9s. a week for each child between two and fourteen years of age. The lower rate is paid in the southern districts and the higher in the central and northern districts. A similar payment is made to mothers or other female relatives who are unable to support the children for whom they seek relief. In granting this assistance the Department exercises caution and makes full inquiries in each case. There were 4,971 children boarded out with their own mothers or other female relatives. These children belonged to 2,024 families.

When a State child reaches the age of 14 it is usually hired out to service. In the year 1919 440 children were dealt with in this way. It is stated that only very rarely has information been received that a State child has been ill-treated while in service. The Director makes some very caustic remarks concerning the rash statements of some newspaper correspondents concerning the treatment of State children in service. He maintains that, if the statements made were true, the correspondents should be severely punished for not disclosing the facts to the Department. The child receives one-quarter or less of the wages earned on discharge and the remainder in instalments spread over three years. The chief reason of this instalment system is to prevent the parents of these children, who have up to that time neglected or deserted them, obtaining possession of the money.

The Department does not favour adoption of State children, although provision is included in the Act. In the year 1919 73 children were adopted. All adopted children are subject to inspection. Under certain conditions children are released on probation. The release may take place by order of the Court on committal or it may be ordered from one of the institutions. The child on probation is subject to inspection and if the conditions under which it is living are unsatisfactory, it may be arrested and brought again before the Court.

The *Infant Life Protection Act, 1905*, contains provision for the safe care of infants. Any person who keeps a child apart from its parent for a fee or reward, must be registered as a nursing home keeper and her premises must be registered as a nursing home. It is stated that this provision is not generally understood. During the year 1919 47 fresh applications were received, of which 42 were approved. The total number of registered homes on the last day of the year was 70 and the number of infants in these homes was 153. It appears that notices are sent to the Department of all illegitimate births. During the year 1919 1,073 illegitimate children were born in Queensland. Of these, 179 were admitted to the registered nursing homes. During illness some of these infants were transferred to hospitals and 35 of them died in hospital. In addition, six died in the registered homes. The mortality among illegitimate children generally in the State was just under 23%, while among those admitted to the registered homes it was 22.4%. The Act does not provide sufficient safeguards for infants after adoption. No inquiries are made before the adoption and in some instances, when the adopting person is impecunious, an application is made to the State for the maintenance of an adopted child.

INSPECTION OF SCHOOL CHILDREN IN VICTORIA.

The medical inspection of school children in Victoria was formerly carried out by four medical officers. When war broke out the staff consisted of three, namely, Dr. Harvey Sutton, Dr. Jane S. Greig and Dr. Eileen Fitzgerald. Dr. Sutton went on active service in 1916 and from that time until his return after the end of the war, the work fell on the shoulders of the two remaining medical officers. We learn that Dr. W. H. Heyward and Dr. H. C. Varley have been appointed on probation as school medical officers in the Department of Public Instruction. An announcement has been made to the effect that two dentists will be appointed within a short time to take charge of a dental clinic in St. Kilda Road. We congratulate the Department on having taken the first step in the proper development of the medical branch. We trust that no time will be wasted before the number of medical officers is increased to twelve.

Naval and Military.

Australian Imperial Force.

APPOINTMENTS TERMINATED.

Second Military District.

Major L. May, D.S.O., M.C., 19th April, 1920.
Captain J. W. S. McKee, 2nd March, 1920.

Third Military District.

Major K. S. Cross, 19th April, 1919.

Obituary.

WILLIAM MORRISON.

William Morrison's death on January 24, 1921, has left the medical profession the poorer by the loss of a man of high intellectual attainments. He was born in Elgin, Scotland, in 1856. The family was distinguished by its scholarly members. His father was for many years Rector of the Glasgow Academy; four of his uncles were headmasters of schools, while his cousin, the late George Ernest Morrison, "Pekin Morrison," won golden laurels as the *Times* correspondent, as an imperialist and as the political adviser of the President of the Celestial Empire. His education was conducted in Glasgow, first at school and then at the University. He graduated in arts and then proceeded to the study of medicine. In 1881 he took the degrees of bachelor of medicine and master of surgery. Three years later he gained his doctor of medicine degree. Soon after graduation he sailed for Australia and entered into partnership with the late Dr. Foster, of Colac, Victoria. He practised in this district until his appointment as Resident Medical Superintendent of the Ballaarat Hospital in 1885. In 1886 he relinquished this position to join Dr. Bradford in general practice in Ballaarat. For thirty-four years he continued to command the respect of his colleagues, patients and friends in that city.

William Morrison cultivated many interests outside his professional work. He worked assiduously for the Art Gallery, for the Ballaarat College and for Saint Andrew's Kirk. In his leisure hours he indulged quietly his hobbies of gardening and birds, avoiding the limelight. He was widely read and a perfervid Scot, with an intense admiration for Barrie and "all his works."

He was a staunch friend, slow to make friendships, but constant to those whom he counted among his friends. He was, perhaps, often too outspoken, but his criticism was tempered by a quaint Scottish humour.

The immediate cause of his death was *angina pectoris*, but as he was at work, in apparently good health twenty-four hours before the end, his was an ideal going to rest. A widow and one daughter survive him.

It is with great regret that we have to record the sudden death on March 8, 1921, of the Honourable J. L. Beeston, C.M.G., at Newcastle.

Correspondence.

ARC LIGHT OPHTHALMIA.

Sir: Through the medium of your columns I desire to bring to the notice of the profession a form of occupational ophthalmia which, so far as I am aware, has not been described in Australia hitherto.

I refer to a severe ophthalmia occurring in those acting in or producing moving pictures which are taken by artificial light.

Similar ophthalmias are well known and require no comment. They may readily be avoided.

In this case avoidal is difficult, because: (*a*) The naked eye must be exposed to direct rays. (*b*) The hours of work are longer than under other conditions. (*c*) Often but slight exposure is necessary to cause severe symptoms.

It is no exaggeration to say that all who have worked with "lights" have suffered to some extent. In America among those concerned in the making of pictures, the condition is referred to as "Kleig eye," "Kleig" being the slang term applied to the powerful arc lights used, the first of which were designed and made by the firm of Kleig.

In view of the recent increase in the number of pictures produced in Australia, these preliminary notes are sent.

Absolute rest, alternate hot and cold applications to the lids and an eye-wash composed of cocaine, adrenalin, chloride and boric lotion give great relief in the acute stage.

Needless to say, protective glasses should be worn whenever possible and the unprotected eyes exposed as little as possible.

Yours, etc.,
RAMSAY SMITH,
Surgeon Lieutenant-Commander, R.A.N.
H.M.A.S. *Brisbane*, Fremantle,
February 21, 1921.

Medical Appointments.

The appointment as Quarantine Officers of Dr. A. H. Baldwin and Dr. G. H. Burnell (B.M.A.) and of Dr. W. P. Yates (B.M.A.) as Quarantine Officer at Busselton, Western Australia, is announced in the *Commonwealth of Australia Gazette*.

Dr. Gerald B. Carter (B.M.A.) has been appointed Medical Officer in charge of the Cottage Hospital at New Norfolk, Tasmania, where he is also engaging in private practice.

Medical Appointments Vacant, etc.

For announcements of medical appointments vacant, assistants, locum tenentes sought, etc., see "Advertiser," page xxiii.

Sydney Hospital: Honorary Surgeon.
Government of Tasmania: Medical Officer for the Hydro-Electric Department.
Isisford District Hospital, Queensland: Medical Officer.

Medical Appointments.

IMPORTANT NOTICE.

Medical practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429 Strand, London, W.C.

Branch.	APPOINTMENTS.
NEW SOUTH WALES. (Hon. Sec., 30-34 Elizabeth Street, Sydney.)	Australian Natives' Association. Ashfield and District Friendly Societies' Dispensary. Balmain United Friendly Societies' Dispensary. Friendly Society Lodges at Casino. Leichhardt and Petersham Dispensary. Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney. Marrickville United Friendly Societies' Dispensary. North Sydney United Friendly Societies. People's Prudential Benefit Society. Phœnix Mutual Provident Society.
VICTORIA. (Hon Sec., Medical Society Hall, East Melbourne.)	All Institutes or Medical Dispensaries. Manchester Unity Independent Order of Oddfellows. Ancient Order of Foresters. Hibernian Australian Catholic Benefit Society. Grand United Order of Free Gardeners. Sons of Temperance. Order of St. Andrew. Australian Prudential Association Proprietary, Limited. Mutual National Provident Club. National Provident Association.
QUEENSLAND. (Hon. Sec., B.M.A. Building, Adelaide Street, Brisbane.)	Australian Natives' Association. Brisbane United Friendly Society Institute. Stannary Hills Hospital.
SOUTH AUSTRALIA. (Hon. Sec., 3 North Terrace, Adelaide.)	Contract Practice Appointments at Renmark. Contract Practice Appointments in South Australia.
WESTERN AUSTRALIA. (Hon. Sec., 6 Bank of New South Wales Chambers, St. George's Terrace, Perth.	All Contract Practice Appointments in Western Australia.
NEW ZEALAND: WELLINGTON DIVISION. (Hon. Sec., Wellington.)	Friendly Society Lodges, Wellington, New Zealand.

Diary for the Month.

Mar. 15.—N.S.W. Branch, B.M.A., Council (Quarterly).
Mar. 16.—W. Aust. Branch, B.M.A..
Mar. 17.—Vic. Branch, B.M.A., Council.
Mar. 17.—N.S.W. Branch, B.M.A., last day for return of ballot papers for election of the Council.
Mar. 18.—N.S.W. Branch, B.M.A., Annual General Meeting.
Mar. 22.—N.S.W. Branch, B.M.A., Council.
Mar. 25.—Q. Branch, B.M.A., Council.
Mar. 30.—Vic. Branch, B.M.A., Council.
Mar. 31.—S. Aust. Branch, B.M.A..
Apr. 1.—Q. Branch, B.M.A..
Apr. 6.—Vic. Branch, B.M.A..
Apr. 8.—N.S.W. Branch, B.M.A., Clinical.
Apr. 8.—Q. Branch, B.M.A., Council.
Apr. 8.—S. Aust. Branch, B.M.A., Council.

EDITORIAL NOTICES.

Manuscripts forwarded to the office of this journal cannot under any circumstances be returned.

Original articles forwarded for publication are understood to be offered to *The Medical Journal of Australia* alone, unless the contrary be stated.

All communications should be addressed to "The Editor," *The Medical Journal of Australia*, B.M.A. Building 30-34 Elizabeth Street, Sydney. (Telephone: B. 4635.)